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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/535,300	03/24/2000	Alan W. Schwabacher	2003118-0001 (T00003US)	2305
24280	7590	11/28/2005	EXAMINER	
CHOATE, HALL & STEWART LLP TWO INTERNATIONAL PLACE BOSTON, MA 02110			SHIBUYA, MARK LANCE	
			ART UNIT	PAPER NUMBER
			1639	

DATE MAILED: 11/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 09/535,300	Applicant(s) SCHWABACHER ET AL.	
	Examiner Mark L. Shibuya	Art Unit 1639	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 November 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 75-90 is/are pending in the application.
- 4a) Of the above claim(s) 83-90 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 75-82 is/are rejected.
- 7) ☒ Claim(s) 75-82 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/4/2004</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. Claims 75-90 are pending. Claims 83-90 have been withdrawn from consideration. Claims 75-82 are examined.
2. The applicant's Reply, entered 6/24/2005, has been considered. Rejections and/or objections not reiterated from the previous Office action, mailed 6/3/2004, are hereby withdrawn. The following rejections and/or objections are either newly applied or are reiterated and are the only rejections and/or objections presently applied to the instant application.

#### ***Continued Examination Under 37 CFR 1.114***

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/24/2005 has been entered.

#### ***Election/Restrictions***

4. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 75-82, drawn to a chemical testing apparatus comprising an optical fiber and a combinatorial library of probe compounds attached at discrete

locations along the length of the optical fiber, classifiable in class 435, subclass 287.9.

- II. Claims 83-90, drawn to a method of testing an analyte having target compounds, comprising preparing an optical fiber with a combinatorial library of probe compounds attached at discrete locations along a length of the optical fiber, exposing the prepared optical fiber to target compounds and photometrically analyzing the exposed and prepared optical fibers to detect reaction of the probe compounds with the target compounds, classifiable in class 435, subclass DIG 15.

The inventions are distinct, each from the other because of the following reasons:

The Invention of Group II and the Invention of Group I are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus may be used in a method in which the probes on the optical fiber are analyzed by antibody-enzyme linked immunoassay, which is different from the photometric method of Group II. It is noted that the apparatus of claim 75 does not recite any element or structure that photometrically analyzes the exposed and prepared optical fibers, in order to detect reaction of the probe compounds with the target compounds.

Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

This application contains claims directed to the following patentably distinct species of the claimed invention: Types of probe compounds.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claim 75, 76, 83 and 84 are generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over

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the prior art, the evidence or admission may be used in a rejection under 35

U.S.C. 103(a) of the other invention.

During a telephone conversation with Attorney Hunter Baker on 10/27/2005 a provisional election was made with traverse to prosecute the invention of Group I, claims 75-82 and the species of peptides. Affirmation of this election must be made by applicant in replying to this Office action. Claims 83-90 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention. Applicant traversed on the ground that examination of both Groups I and II would not constitute an unreasonable administrative burden. This argument has been considered fully but is not deemed persuasive. The apparatus of claim 75 does not recite any element or structure that photometrically analyzes the exposed and prepared optical fibers, in order to detect reaction of the probe compounds with the target compounds, and so the apparatus of Group I is not commensurate with the claimed invention of Group II.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

***Priority***

5. This application is a continuation-in-part of 09/253,153, filed 2/19/1999, which claims benefit of 60/075,629, filed 2/21/1998.

***Information Disclosure Statement***

6. The information disclosure statement (IDS), entered 11/4/2004, has been considered.

***Claim Objections***

7. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 83-98 have been renumbered as 75-90. Applicant, in the amendment filed after final rejection 11/4/2005, added claims "75-82". However, the claims amended after final rejection were not entered (see Advisory Action, entered 12/9/2004). Therefore, numbering starts with claim 75 and the pending claims now are claims 75-90. The number of the claims depended upon must be amended in claims 76-82, as appropriate to the corrected renumbering of the pending claims.

***Claim Rejections - 35 USC § 112, First Paragraph***

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

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The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claims 75-82 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. This is a new matter rejection.

Claim 75, and its dependent claims, (particularly claims 79 and 80) state the terms "substantially one-dimensional support" and "predetermined pattern". There does not appear to be specific support for these limitations in the specification as originally filed. Applicant must point, with particularity, to where in the specification support for the amendments may be found.

***Claim Rejections - 35 USC § 112, Second Paragraph***

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 75-82 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "substantially one-dimensional support" in claim 1 is a relative term which renders the claim indefinite. The term "substantially one-dimensional" is not



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defined by the claim, the specification does not provide a standard for ascertaining the requisite degree of one-dimensionality, and one of skill in the art would not be reasonably apprised of the metes and bounds of the claimed invention.

Claim 78 in line 3, states the language "to interact with multiple different probe molecules", which renders the claim vague and indefinite, because it is unclear as to what does the interacting.

In claim 80, Applicant's usage of the language of "predetermined spatial pattern" appears to read upon a mental step. It unclear as to who or what has "preselected" the peptide fragment. Also, it is unclear as to whether the language refers to a mental step or attempts to refer to a structural limitation of the claimed product. It is not disputed that applicant may be their own lexicographer. Therefore, claim 80 does not reasonably apprise of one skill in the art as to the metes and bounds of the claimed invention.

Claim 81 states the language "with different of the probe molecules", in lines 2-3, which is grammatically incorrect.

Claim 82 recites the limitation "the received light" in line 2. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

13. Claims 75, 76, and 80 are rejected under 35 U.S.C. § 102(a, e) as being anticipated by Stimpson, US 6,037,186, (of record).

The claims are drawn to a chemical testing apparatus comprising: an optical fiber providing a substantially one-dimensional support conducting light along a length between two ends; and a combinatorial library of probe compounds attached at discrete locations along the length of the optical fiber in a predetermined pattern, the probe compounds positioned to be exposed to target compounds applied to the optical fiber, and variations thereof.

Stimpson at col. 1, lines 41-51 and at col. 7, lines 61-65, disclose combinatorial peptide compounds and combinatorial libraries. These compounds and libraries form arrays of protein compounds immobilized as lines on microporous materials (reading on a substantially one-dimensional support) that are glass or other materials, as disclosed at col. 3, lines 35-col. 4, line 45, which are then rolled into rods or bundles (see, e.g., Figures 1A and 2A-2E) that encompass optical fibers because they are capable of transmitting or guiding light.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. § 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claims 75-81 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Browne et al.**, *Anal. Chem.* 1996, vol. 68, 2289-2295; (IDS filed 8/31/2000) and **Pirrung et al. US 5,143,854**, (IDS filed 8/31/2000).

The claims are drawn to a chemical testing apparatus comprising: an optical fiber providing a substantially one-dimensional support conducting light along a length between two ends; and a combinatorial library of probe compounds attached at discrete locations along the length of the optical fiber in a predetermined pattern, the probe compounds positioned to be exposed to target compounds applied to the optical fiber, and variations thereof.

**Browne et al.**, throughout the publication, teach an "intrinsic sol-gel clad fiber optic sensor" (see, e.g., Title and Abstract). **Browne et al.** teach various sensor

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molecule, including sol-gel clad fluorophores AA and CV dyes incorporated into intrinsic regions distributed along an optical fiber (see Figures 1-3). Browne lists "biological analytes" and specifically fluorescently labeled antibodies that can be used in a fiber-optic chemical sensor (p. 2289, 2<sup>nd</sup> column). Brown at Figures 1 and 2 teach a light source providing light which is conducted along the optical fiber (as in claim 77), wherein the light source is attached to at least one end of the optical fiber to transmit light by internal reflection (as in claim 78, see p. 2290, para 7-p. 2291, para 1; p. 2292, para 4), wherein the probe compounds are placed on the light fiber to affect the light transmitted down the optical fiber, reading on probe compounds that couple with evanescent waver through the fiber, (as in claim 79); wherein probe molecules repeat with a spatial pattern (as in claim 80, e.g., Figure 3) to interact with light, said interaction detected by use of a light sensor (reading on claim 81).

Browne does not teach an apparatus comprising a combinatorial library of probe compounds and does not teach probe compounds that are peptides.

**Pirrung et al., US 5,143,854**, throughout the patent, teach the creation of arrays through iterative processes (column 1, line 28) and the use of peptides and proteins as the materials of the array (e.g., column 1, line 32 through column 2, line 14 and column 28, lines 5-11). Pirrung specifically teaches that arrays can be synthesized using optical fibers as a support (column 14, lines 55-59). Furthermore, Pirrung teaches the sequential synthesis of peptides or proteins for all possible sequences for a monomer set of size  $n$ , at col. 24, line 1 to col. 25, line 40, which absent evidence to the contrary, is tantamount to synthesizing a library of peptides or proteins.

It would have been *prima facie* obvious at the time the invention was made for one of ordinary skill in the art to have made and used a chemical testing apparatus comprising: an optical fiber providing a substantially one-dimensional support conducting light along a length between two ends; and a combinatorial library of probe compounds attached at discrete locations along the length of the optical fiber in a predetermined pattern, the probe compounds positioned to be exposed to target compounds applied to the optical fiber, wherein the probe compounds are peptides, and variations thereof.

One would have been motivated to do so because Browne et al. teach that intrinsic chemical sensors having agents, which are “macroscopically distributed along a single optical fiber”, are suited for certain specific sensing applications (see Browne et al., p. 2292) and Pirrung teach peptide or protein libraries on optical fiber, col. 24, line 1 to col. 25, line 40) for screening biological activity (see Pirrung et al. at column 3, lines 35-61).

One of ordinary skill in the art would have had a reasonable expectation of success because attaching a combinatorial peptide library to optical fibers functionalized with reactive groups, was known in art, as taught by Pirrung et al.

15. Claims 75-81 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Browne et al.**, *Anal. Chem.* 1996, vol. 68, 2289-2295; (IDS filed 8/31/2000) and **Adams et al.**, US 6,156,494.

**Browne et al.**, is relied upon, as above.

Browne does not teach an apparatus comprising a combinatorial library of probe compounds and does not teach probe compounds that are peptides.

**Adams et al., (US 5,143,854)**, throughout the patent and abstract, and, e.g., at col. 2, line 31-col. 4, line 40, teach a chemical testing apparatus comprising: a combinatorial library of probe compounds attached to optical fibers, wherein the probe compounds are synthesized and positioned by iterative and repeated synthetic processes (col. 9, line 50-col. 10, line 20), for exposure to target compounds applied to the optical fiber. Adams et al., at col. 1, lines 50-56, teach that combinatorial methods have been used to synthesize libraries of oligomeric compounds, such as peptides.

It would have been *prima facie* obvious at the time the invention was made for one of ordinary skill in the art to have made and used a chemical testing apparatus comprising: an optical fiber providing a substantially one-dimensional support conducting light along a length between two ends; and a combinatorial library of probe compounds attached at discrete locations along the length of the optical fiber in a predetermined pattern, the probe compounds positioned to be exposed to target compounds applied to the optical fiber, wherein the probe compounds are peptides, and variations thereof.

One of ordinary skill in the art would have been motivated to have attached a combinatorial library of probe compounds to an optical fiber in a chemical testing apparatus, because the reference of Adams et al., in order to use electromagnetic energy, such as light or heat, in methods for screening library compounds for desirable properties, such as their binding to, for example, a fluorescent labeled biomolecule

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(Adams et al. at col. 3, lines 37-63). One would have been motivated to make and use probe compounds that are peptides in the course of synthesizing a wide range of chemistry types amenable to library generation, as taught by Adams et al. at col. 1, lines 47-63.

One of ordinary skill in the art would have had a reasonable expectation of success in making and using such an apparatus, because attaching a combinatorial library to optical fibers functionalize with reactive groups was known in art, as taught by Adams et al.

16. Claim 82 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Browne et al.**, *Anal. Chem.* 1996, vol. 68, 2289-2295, (IDS filed 8/31/2000) and **Pirrung et al.**, US 5,143,854, (IDS filed 8/31/2000), as applied to claims 75-81, or over **Browne et al.**, *Anal. Chem.* 1996, vol. 68, 2289-2295; (IDS filed 8/31/2000) and **Adams et al.**, US 6,156,494, as applied to claims 75-81 above; and further in view of **Grow et al.**, US **6,040,191 A**.

The claims are drawn to a chemical testing apparatus comprising: an optical fiber providing a substantially one-dimensional support conducting light along a length between two ends; and a combinatorial library of probe compounds attached at discrete locations along the length of the optical fiber in a predetermined pattern, the probe compounds positioned to be exposed to target compounds applied to the optical fiber, and wherein the apparatus comprises a means for Fourier analysis of the light.

The references either of Browne et al (*Anal. Chem.* 1996, vol. 68, 2289-2295; IDS filed 8/31/2000) and Pirrung et al. (US 5,143,854; IDS filed 8/31/2000), or Browne et al., *Anal. Chem.* 1996, vol. 68, 2289-2295; (IDS filed 8/31/2000) and Adams et al., US 6,156,494; are relied upon as above.

The references either of Browne et al (*Anal. Chem.* 1996, vol. 68, 2289-2295; IDS filed 8/31/2000) and Pirrung et al. (US 5,143,854; IDS filed 8/31/2000), or Browne et al., *Anal. Chem.* 1996, vol. 68, 2289-2295; (IDS filed 8/31/2000) and Adams et al., US 6,156,494; do not teach a chemical testing apparatus comprising a means for Fourier analysis of the light.

**Grow et al., US 6,040,191 A.**, throughout the patent, and especially at col. 22-23, and claim 8, teach means for Fourier transform systems as a part of Raman spectrometer. Grow et al., state:

In yet another configuration, antibody bioconcentrators may be immobilized on the uncladded surface of a thin, flexible, fiber optic in a coil or bundle, coupled to a long, cladded fiber optic cable. Exciting light traveling down the cable is launched into the coil at an angle, to travel through the coil by the evanescent wave of multiple internal reflection, thereby causing the light to interact repeatedly with the bioconcentrators on the surface of the coil. As the evanescent wave reaches the end of the coil, it is transferred back into the cable for transport to a Raman spectrometer. By using an evanescent wave, exceptional sensitivity may be attained.

Grow et al., at col. 61, lines 1-12.

It would have been *prima facie* obvious at the time the invention was made for one of ordinary skill in the art to have made and used a chemical testing apparatus comprising an optical fiber providing a substantially one-dimensional support conducting light along a length between two ends; and a combinatorial library of probe compounds



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attached at discrete locations along the length of the optical fiber in a predetermined pattern, the probe compounds positioned to be exposed to target compounds applied to the optical fiber, and wherein the apparatus comprises a means for Fourier analysis of the light.

One of ordinary skill in the art would have been motivated to have made and used an apparatus comprising a means for Fourier analysis of the light because Grow et al. teach the use of such an apparatus for exceptional sensitivity in detecting binding to antibodies, which read on peptides, immobilized upon optical fibers.

One of ordinary skill in the art would have had a reasonable expectation of success in making and using such an apparatus, because means for Fourier analysis of light signals were well known in the art, as taught by Grow et al.

### ***Conclusion***

17. Claims 75-82 are rejected.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Shibuya whose telephone number is (571) 272-0806. The examiner can normally be reached on M-F, 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Wang can be reached on (571) 272-0811. The fax phone number for the organization where this application or proceeding is assigned is 571-272-8300.

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Mark Shibuya  
Examiner  
Art Unit 1639

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